SUPPLEMENT.

The Mining Journal,

RAILWAY AND COMMERCIAL GAZETTE:

FORMING A COMPLETE RECORD OF THE PROCEEDINGS OF ALL PUBLIC COMPANIES.

No. 1689.—Vol. XXXVIII. LONDON, SATURDAY, JANUARY 4, 1868. {STAMPED .. SIXPENCE. UNSTAMPED. FIVEPENCE.

SOUTH WALES INSTITUTE OF ENGINEERS.

The annual general meeting of this institution, at which Mr. MARTIN presided, was held at Aberdare, there being a large number of members present. Several sectional drawings of Davies' self-acting steam striker were exhibited, also a quantity of patent fuel manufactured under the direction of Mr. Bassett, full particulars of which were published in our report of the last meeting. Several of Dalone and Thomas's patent improved pitmen's picks were shown, and closely inspected by several members before the commencement of the meeting.

Mr. MARTIN, on taking the chair, said that would be his last sitting as President of the institution, and they must allow him to thank them for the valuable assistance they had on all occasions rendered him in carrying out the business of the meetings; that kindness would never be erased from his memory, and he hoped the South Wales Institute of Engineers would continue to increase in usefulness and prosperity. (Hear, hear.) He must say that the President they had selected for the ensuing year would be able to discharge the duties of the office with more ability than himself, and he hoped they would render the same kindness unto him as they had to himself. He concluded by saying that he hoped he should live to see the youngest member of the institute occupying the chair he was that day about to vacate. (Applause.)

The minutes of the last meeting were read and confirmed.

The PRESIDENT said as there was no opposition to the gentlemen proposed at the last meeting he now declared them duly elected.

Mr. Bedlington was elected President, and all the retiring officers were re-elected.

The following were balloted for, and duly elected:—Mr. Elias J. Beor, mining engineer, Swansea; Mr. Daniel Rees, Letty Shenkin, Aberdare; Mr. W. Thomas, jun., Gadlys Ironworks; Mr. F. H. Brown, Bishwell Colliery, near Swansea; Mr. Loam, Liskeard, Cornwall; Mr. H. Kirkhouse, Bwllfa, Aberdare; Mr. T. Ellis, jun., Aberdare, and Mr. T. J. Bewick, Haydon Bridge, by Carlisle.

The SECRETARY read the statement of accounts for the past year, which was very satisfactory, there being a balance in favour of the institute of upwards of 300*l.*

Mr. T. Dyne Steel's paper "On the Tillery Coal Seams and Workings, Abertillery," of which the subjoined is an abstract, was then read:

Abertillery is situated about 17 miles north-west of Newport. The district referred to in Mr. Steel's paper extends from Aberbeeg on the south, to the summit of Cwmtillery on the north, the Ebbw Fach river on the west, and the fault which divides the minerals of the Varteg liberty of Messrs. Vipond and Co.: it is rich in the whole of the minerals of the basin. Collieries were opened on the seam near Abertillery many years ago, and pillar and stall was the system of working adopted: no other was then known in the district. From the nature of the roof and the tenderness of the coal, much waste and loss of coal was the result. Double stalls were tried at a later period, with no better success. The pillars could not be got in a marketable state. It was manifest that the seam was peculiarly adapted for long-wall working, plenty of rubbish for gobbing, with good top and bottom. A partial system of long-work was, therefore, tried at the Rhiwpark and Cwmnant-y-groes collieries under great difficulties, the men persistently refusing to open out the work, on the plea that their lives would not be safe. A large number of Somersetshire colliers were brought over, who were more accustomed to long-work, and a great many of these men have since stuck to the neighbourhood. In the year 1857, the author became manager of four collieries working the Tillery seam, and he found the practice was to leave pillars of coal for the supposed support of all headings, and stumps in various places where the roof was suspected, which occasioned great waste and loss of coal, as the pillars crumbled down into the roads, and no area of pillar seemed sufficient either to support the roof, or prevent its being crushed into an unmarketable condition. The author then commenced a more complete system of long-wall work, taking out the whole of the coal, and substituting pack-walls for pillars on the working roads. This system as was to be expected, answered exceedingly well, both under a heavy clod roof and rock.

In the present system, main headings are driven to the direct rise, or nearly so, of the coal, which is due east. Cross headings are driven therefrom 50 yards apart right and left, with sufficient rise for drainage. Stall or stall roads are driven from the cross headings to the rise 20 yards apart, and as the main heading advances fresh cross headings are commenced; these last cut off the first stall on the last cross heading, and as they advance the stalls are cut off one by one, and new stalls opened from the new cross heading. Strong pack walls were built on either side the headings, and all vacant places well stowed with rubbish; these walls stand well after the first squeeze. At the junction of each heading and cross heading, and each stall and cross heading, strong timber cogs are built on the rise side, formed of whole timbers set longitudinally in triangles of about 6 ft. 6 in. Bottom is cut in the headings for head-room. Horses do not travel the stalls; the colliers push the trams in and out of the stalls to meet the hauliers; bottom is rarely cut in the stalls.

The colliers hole in the clod above the bottom coal, and the top lifts are first worked away. The bottom coal is then got, by wedging either on the top or bottom, as circumstances require; and comes away readily in large blocks. The cleat or cleavage is on the level course of the coal, which is worked on the face. Slips are rarely met with. The colliers set props and build gob walls behind them, and these gobsticks are a source of much trouble and expense. The length of face now open uninterruptedly in this colliery is 700 yards. The whole of the coal is got at one operation, no pillars or stumps of any description being left. The ventilation is simple, the seam emits no fire-damp, and one door near the mouth of each main heading is found sufficient to send plenty of wind round the working face. The section of the seam, as before observed, presents remarkable facilities for long-wall working; but, in spite of this, the author found the greatest possible difficulty in overcoming the prejudices of the men, who persisted in throwing every obstacle in the way. A firm and constant pressure was at last successful, and he thoroughly believes that no inducement would now make the men return to the former system.

The quantity of coal lost in working, or not marketable, is probably even now, in excess of what might be expected, considering that the whole of the coal is worked away. The whole of the small coal is gobbed, and for many reasons presently referred to, the total yield of good large coal is not so satisfactory as could be desired. The author had an opportunity some time since of testing, at the Cwmnant-y-groes colliery, the quantity got from a given area. The present yield of coal at the Tillery collieries is about 95 per cent. The loss arises from threads, soft coal, and small coal gobbed, as the whole of the coal can be got without waste in holing. The author avows himself a strong advocate of long-wall work, and he desires to record his opinion, formed on some considerable experience in both pillar and stall and long-wall work, that a most serious waste of coal has been occasioned in South Wales in former years by the obstinate adherence by the colliers to the pillar and stall system.

Of course there are a few instances, or seams, where it cannot well be applied. He has worked the Big Vein and Elled to a considerable extent by long wall;—the former with as bad a roof as can be found, the latter with a good but heavy and treacherous roof, with equally satisfactory results. He believes that for saving from waste in working the stores of coal we are so bountifully blessed with, it is the best system yet adopted by mining engineers; and it is the bounden duty of all engaged in mining pursuits to obtain the highest possible yield of coal per acre. The vast quantity of coal in the South Wales basin alone is sufficient to calm any fears as to its probable duration. Centuries will not see the end of it, but we nevertheless have no justification for the wilful and ignorant waste which has been suffered in past years of this grand mineral, upon which the present high position of this county has been entirely founded.

Mr. STEEL, in reply to Mr. Bedlington, respecting the long-wall system being applied to the Brithdir seams, said that colliery possessed peculiarities the other did not, and that it was impossible to apply a general rule in every case.

MECHANICAL VENTILATION.—This subject, which has been discussed at several previous meetings, was again resumed.——Mr. COPE PEARCE related a few experiments made ut the Gethin Pit, and said Mr. Bates could give them some more.——Mr. BATES, after alluding to the idea he entertained regarding the mode of ventilation, went on to say—A discussion on the various modes of ventilating coal mines is certainly a subject of unlimited interest to us all, whether the appliances be machinery, furnace, or any other artificial means whatever. The subject or discussion becomes more interesting, and is likely to be of infinite value, when the object sought, or the desired end to be attained, is the comparative merits of the several appliances now in use. Much has been said on this very important subject already by many gentlemen, under varied circumstances and experience, and arriving, in many instances, at different conclusions, a fact which ought to make us all the more careful in collecting the particulars and data whereon we base our calculations on any system of ventilation whatever. Mr. Pearce, in his paper on "Mechanical Ventilation," contributed to this institution, has given some valuable information, also the results of some useful experiments at Pelton and Elswick Collieries, with Guibal's fan, as well as some very useful statistics gathered from various sources. At Pelton, in the fifth experiment, with 64 revolutions, the shutter half open, and horse-power of engine 58·18, they got 106,802 cubic feet of air per minute, with a water gauge pressure of 2·8 inches, which gives 80·99 per cent. of power utilised, excluding back pressure, an extraordinary percentage indeed; and in the ninth experiment, at Elswick, they have, with 57¼ revolutions, the shutter half open, and 19·73 horse-power or engine, 60,441 cubic feet of air per minute, with a water-gauge of 1·4 inches, which gives 67·56 useful percentage of the power transmitted to the fan, which is also very good. We have also commenced a fan on Guibal's principle at the Gethin Collieries, belonging to the Cyfarthfa Ironworks. The diameter of the fan is 29 ft. 6 in.; breadth, 9 ft. 8 in.; diameter of engine cylinder, 2 ft.; length of stroke, 2 ft. 6 in. over vanes. The results are as follow:—

No. of experiments.	Position of shutter open.	Revolutions per minute.	Pressure on piston, not including exhaust.	Pressure on piston, including exhaust.	Horse power, not including exhaust.	Horse power, including exhaust.	Cubic feet of air per minute near the fan.	Water-gauge at the fan.	Cubic feet of air per minute in the mine.	Water-gauge in the mine.	Horse power in air.	Percentage utilised, exhaust not included.	Percentage utilised, exhaust included.
1	⅜	68	28	—	130·5	—	—	—	138,900	1·2	26·3	20·1	—
2	⅝	64	27	27·8	118·4	121·95	158,400	3	—	—	74·99	63·3	61·49
3	⅞	75	31·2	32·9	160·3	169·1	199,200	3¾	—	—	117·89	73·5	69·7
4	⅝	42	11·45	11·95	32·96	34·4	96,000	1·4	—	—	21·2	64·3	61·6
5	⅝	61	21·65	22·4	90·52	93·65	141,600	2·6	—	—	58·1	64·1	32
6	⅞	61	23·35	24·15	97·6	100·97	153,600	2·6	—	—	63	44·5	62·3
7	⅞	61	23·35	—	97·5	—	—	—	126,250	1·4	27·89	28·57	—

We have also obtained the workings or the general results of a Struvé ventilator working at Risca Colliery, with two tanks 18 ft. in diameter each, 6 ft. stroke, and eight strokes per minute, driven by a single engine, 18 in. in diameter of cylinder, 3 ft. stroke, and 35 lbs. steam pressure; this gives the horse-power of engine 41·51, allowing one-fifth for friction. Under these conditions 43,866 cubic feet of air per minute was got, with a water-gauge pressure of 2·31 inches. This gives the power utilised, or duty done, to be 38·37 per cent. The capacity of these tanks at the above dimensions and rate of going is nearly 49,000; and at this place a furnace was put into operation to supplant the ventilator; and the average of 24 experiments or working days, commencing July 19, 1863, and ending Aug. 28 of the same year, show that mechanical power, as a means of ventilating coal mines, is above that of the furnace, except under the circumstances of extraordinary deep pits, with an average barometer when the furnace was at work of 30·8 in., and a water-gauge pressure of 1·41 in., they got 34,088 cubic feet of air per minute. The furnace was stopped and the ventilator set to work again, with an average barometer of 30·4 in., which is near to the case of the furnace, and a water-gauge pressure of 2·31 in., we got 43,866 cubic feet of air per minute, showing in favour of the ventilator 9·778, and nearly 1 inch of water pressure. We will now analyse these results of the ventilator and the furnace, then we will be able to see the relative merits under these conditions. Experiments of this description are very useful, and, as I have said before, the particulars and details ought to be carefully registered. But in this case it is to be regretted that the temperature of the downcast and upcast pits are not given, which makes the calculations a little more tedious to arrive at the two systems. Nothwithstanding this, as the time of year is given, and the knowledge we have of temperatures in furnace pits, we may suppose very near what it would be; therefore, we will assume the average temperatures of the two pits to be 50° and 170° respectively; and, by using one of the usual formulas to find the weight of a cubic foot of air under any temperature or pressure, we may test our suppositions in order to see if they will confirm this state of things. We shall thus find ·08019 lbs. the weight of a cubic foot of air in the downcast pit, and ·06489 lbs. the weight of a cubic foot of air in the upcast pit. Then ·08019—·06489 = ·0153 lbs. the difference per cubic foot between the two pits, this into the depth of the pit. Whence ·0153÷480=7·344 lbs. pressure per square foot area, this divided by 5·2 lbs., the pressure per squre foot area for 1 in. of water-gauge. We have 7·344÷5·2=1·412, the water-gauge got by the furnace; therefore, this proves our hypothesis to be near the truth. I will now apply an ordinary process of reasoning to arrive at what depth the pit ought to have been to equal the power of the ventilator at these temperatures, and find it to be 785·27 feet the depth of the pit, and consequently 2·31 in. water-gauge, the same as that which the ventilator produced when at work. Again, if they took the temperatures instead of the depth, we will see what temperatures it would have taken in the upcast pit of 480 ft. in depth to equal the power of the ventilator. Whence, as 278° nearly is the temperature required to raise the water-gauge 2·31 in. under the same conditions, and by using the formula as before, we have ·055 lbs. the weight of a cubic foot in the up-cast pit, and ·0801 lbs. the weight of a cubic foot at 50°; therefore, 2·32 in. is the water-gauge that these temperatures would give under the same circumstances, which equals nearly the water indication got by the ventilator; or, if we take the given quantity of air, together with the water-gauge in these cases, in order to see if the quantities correspond, we ultimately get 34,271 cubic feet, which is very near to the quantity measured when the furnace was at work—34,088 cubic ft.; therefore, it is plain it would have taken a pit 785 ft. deep, instead of 480 ft., or an average temperature of 278°, which is almost impossible to be got, to equal the power produced by the ventilator.—Mr. Bates concluded his remarks by referring to what Mr. Pearce had stated respecting the depth and quantity of air they had in the Pelton pit when the furnace was at work, previous to the commencement of the fan; but, as the table made use of by Mr. Pearce was refused for the use of our reporter, we are unable to give the details referred to.

In reply to a member, Mr. BATES said the whole of the experiments had been fairly made, and he might say that they had six different splits to supply the fan with.——Mr. BROWN asked if they could tell them the cost of the engines, and all other expenses?——Mr. PEARCE said he could not then. The original estimate was about 1600*l.*, but it would be over that amount when completed. They had begun to weigh the coal used, but they were not yet prepared to say what quantity was used.——Mr. BEDLINGTON: Can you give the quantity in the splits?——Mr. BATES said he would do so at the next meeting.

The CHAIRMAN: In making your experiments at Cyfathfa did you stop your engines?——Mr. BATES replied that they had.

The CHAIRMAN: Did the circulation continue?——Mr. BATES: Yes; they stopped the engine for six hours, and then they had 20,000 cubic feet.——The CHAIRMAN said that was very satisfactory.

Mr. BATES, in reply to Mr. BEDLINGTON, said it must be natural ventilation. He did not believe after six hours stoppage of the fan it could be other than natural ventilation.

Mr. WILKINSON gave the undermentioned experiments upon Guibal's fan ventilation at work at the Middle Duffryn Colliery, taken with a view of ascertaining the best position of shutter, the engine being driven at a uniform rate of 50 revolutions per minute.

No. of experiment.	No. of strokes by engine.	Pressure of steam.	Extent of shutter open.	Area of shutter open.	Number of revolutions of anemometer.	Area of space under from where experiments were taken.	Total quantity of air going through workings.	Area of space between the fan and upcast shaft, where the experiments were taken.	Revolutions of anemometer.	Total quantity of air ascending the upcast shaft.	Water-gauge at 30 yards from pit bottom.	Water-gauge on surface.
1	50	34	7 in.	5·83	4·00	83·19	33,276	80·61	4·50	36,274	·25	·30
2	50	34	1 ft.	10·00	4·50	83·19	37,435	80·61	5·13	41,352	·50	·55
3	50	34	2 ft.	20·00	5·00	83·19	41,595	80·61	5·75	46,350	·62	·70
4	50	34	3 ft.	30·00	5·50	83·19	45,754	80·61	6·62	53,363	·68	·80
5	50	34	4 ft.	40·00	5·00	83·19	41,595	80·61	7·00	56,427	·62	·80

Barometer on surface, 28·60; thermometer on surface, 53. Barometer underground, 29·15; thermometer underground, 54. Air going through fan at second experiment:—8 revolutions of anemometer × 70 area of space = 56,000. Third experiment:—8·25 revolutions × 70 area of space = 57,750.

Mr. THOMAS attributed the loss of Mr. Wilkinson to a leakage in his valves, and contended that he ought to have got 65,000 cubic feet of air through his upcast instead of only 40,000. At his pit they were able to get from 56,000 to 67,000 cubic feet, at a very reasonable velocity.——Mr. BEDLINGTON: How many strokes per minute for the 56,000?——Mr. THOMAS: Seven-and-a-half.——Mr. BEDLINGTON: And how many for the 67,000?——Mr. THOMAS: About 8 or 8¼.

Mr. WILKINSON said the difference spoken of by Mr. Thomas was easily accounted for, through the fact that his upcast was from 50 to 60 yards higher than his downcast shaft, whereas his (Mr. Wilkinson's) upcast and downcast shafts were upon the same level.

Mr. BASSETT asked Mr. Thomas if his was a fiery colliery?

Mr. THOMAS said it was one of the most fiery in the district. On Saturdays they stopped the engine to look after the valves, and in a short space of time a quantity of gas accumulated; but during the time he had used Struvé's ventilators he had never had any explosion or fatal accident in connection with the ventilation.

Mr. WADDLE said the object of the discussion was, if possible, to decide upon the best mode of ventilation. Struvé's ventilator was very good, but there were others that were more simple, and there were some other machines that would give the same volume of air at half the cost. He understood Mr. Bates to be of opinion that mechanical ventilation was preferable to furnace ventilation.

Mr. BATES said that was what he meant, taking into connection with it the depth of the pit, as he believed it was only to a certain depth that mechanical ventilation was best.——Mr. THOMAS said he did not think Struvé's ventilator was an expensive machine in any way.

Mr. GEORGE ELLIOT said the meeting was probably aware he was largely connected with collieries in South Wales and in the North of England, and he asked permission to be allowed to say a few words. He had been working Struvé's fan at one of his collieries for ten years. It had been of great service, because although in its effects not equal to the furnace, it was a substitute for the furnace when the application of the latter would have been attended with difficulty and danger. With regard to the fan ventilators, of which they had heard so much, two or three were in existence in that part of the country; and others were in operation in the county of Durham. It was his opinion that the day was not far distant when furnace ventilation would be entirely superseded by the use of mechanical ventilation. He believed, moreover, by such appliances they would very much add to the safety of mining operations. The question of higher water-guage was merely a question of force of friction, whether the machine was Struvé's or Guibal's; and, therefore, if they made the engine large enough, and the air course small enough, they would get plenty of water-guage (Cheers and laughter). They need not, therefore, waste time in discussing that point. But it seemed anomalous that with the same power (Struvé's ventilators in both cases), Mr. Thomas should be able to get 10,000 feet more than Mr. Wilkinson, he having 2½ inches, and Mr. Wilkinson ½ in. water-gauge. There must be some inaccuracy in the statements. It would, from what was being done in that district and other parts of the country, become apparent that to get any necessary quantity of air underground all that would be requisite would be to have sufficient power with the fan, or whatever other appliance might be employed, and to have the air courses sufficiently large. He might say, however, that, being formerly in favour of the furnace system, he had given evidence in support of that system. A gentleman had referred to depth, and he (Mr. Elliott) had deep collieries. He felt quite certain now that, totally irrespective of depth

and the natural temperature or internal heat of the mine, it was only necessary to add more power to the fan and working machinery; they could, in fact, get almost any quantity of air they chose out of the pit to return, by having both the machinery and the air courses sufficiently large. He believed they could not do better than apply their minds to the enquiry whether they could not get rid of the dangerous and expensive system of furnaces in pits? He was decidedly of opinion that they would thereby add much to the security of mines; and he was perfectly satisfied that they would economically and judiciously employ their time and money in devising some means of getting rid of the old-fashioned system of the furnace. He would not condemn Struvé's, but he believed the system of the fans recently adopted was the best so far, although he thought they could attain still greater perfection in ventilating power. (Loud cheers.)——The discussion was then adjourned.

The paper by Mr. Alex. Bassett, on "Patent Fuel," which was fully referred to in the *Mining Journal* of Oct. 12, was then read.——The usual votes of thanks were proposed, and the meeting broke up.

In the evening the members dined at the Boot Hotel, where a splendid repast was served. Mr. BEDLINGTON, the newly-elected president, occupied the chair, and Mr. BRIGDEN, the secretary, the vice-chair. The usual loyal and other toasts were given and responded to, and at an early hour the company separated.

Original Correspondence.

ON THE REPORT FROM THE SELECT COMMITTEE OF THE HOUSE OF COMMONS ON MINES, 1867.

SIR,—This report has not received that notice and discussion which its merits, and the great importance of the subjects it treats upon, urgently demand. Unfortunately, the constantly recurring "sacrifice of life in mines and collieries affords abundant proof that the legislative measures hitherto passed have proved to be totally inadequate for securing the personal safety of the miners of this country." This is the averment of a petition to the House of Commons from the miners of Great Britain, and recent circumstances have indubitably proved that, from the now long experience we have had of the working of "the Inspection of Coal Mines' Act," we are compelled to admit that, as regards the saving of life, it has been, and is, a failure. Whether this has arisen from the insufficiency of its provisions, or the inadequacy of its administration, or from both causes, it is difficult to tell. But this we know, that the annual lists of "the killed and wounded" in our collieries speak "trumpet tongued" of the lamentable inefficiency of the law and its administration.

Of late years attempts have been made by Her MAJESTY'S Inspectors of Coal Mines to throw a veil over the hideous facts they are bound to disclose, by giving ingenious calculations as to the loss of life per 1000 men employed, and of the tons of coal raised per life lost, and then comparing these results with those from other districts and other countries. In making these comparisons due care, of course, is taken in the selection, so that the results tell but one tale. Her MAJESTY'S Inspectors studiously keep back the important fact that there are many collieries, sometimes extensive districts, in which there is no fire-damp. We believe the non-explosive collieries constitute a large majority of the coal mines in Great Britain. It is obvious, therefore, that results so obtained are not only valueless, but also propagate a delusion. By skilful "cooking," statistics may be made to speak on both sides of a question, but however ingeniously applied they cannot disprove the deplorable fact that fatal accidents in mines have increased, and are increasing. In despite of the boasted superior scientific knowledge now possessed by the managers of mines, as compared with that of their predecessors, aided as they now are by the scientific attainments and matured experience of the Government Inspectors, it is painfully paradoxical to find that explosions are not only as frequent, but much more destructive of human life, than they used to be in the old times of comparative ignorance and non-inspection. The reports of the Inspectors bear ample evidence to this retrocession. Under such circumstances a revision of the laws on this subject was imperatively needed, and the House of Commons, recognising the necessity of further legislation, appointed a Select Committee in February last, "to enquire into the operation of the Acts for the Regulation and Inspection of Mines, and into the complaints contained in petitions from the miners of Great Britain with reference thereto, which were presented to the House during session 1865."

The report of this Committee was printed in July last, and we now propose to offer a few brief remarks on the alterations in the Inspection Act and in the General and Special Rules, as suggested in this report. The committee recommend that no boys should be employed underground under 12 years of age, and do not think it desirable to impose upon the boys after their admission into the mines any conditions of continued attendance at school. Under the existing law, boys under 10 years of age were prohibited from being employed in mines, and those between the ages of 10 and 12 are also excluded, unless they can read and write, or attend school six hours per week. In cases where there are no schools in the immediate neighbourhood —and in some districts there are many instances of this kind—the observance of the law is impossible; and in all cases great laxity has prevailed in practice, and rendered the rule as to certificates almost inoperative. Although the restriction as to the age of the boys may be thought extreme by both parents and employers, and some inconvenience will necessarily result to both parties, yet this alteration is certainly an improvement on the law as it now exists.

The next subject discussed in the report relates to the safety of the miners whilst at work, and is by far the most important of all the subjects discussed in the report. The Committee recommend the omission of the words "under ordinary circumstances" in the first General Rule of the Act of 1860. The rule is as follows:—

"1. An adequate amount of ventilation shall be constantly produced in all coal mines or collieries and iron-stone mines, to dilute and render harmless noxious gases to such an extent that the working places of the pits, levels, and workings of every such colliery and mine, and the travelling roads to and from such working places, shall *under ordinary circumstances* be in a fit state for working and passing therein."

Many of our readers will recollect that the words now proposed to be omitted formed no part of the draft of the bill which was submitted by Sir GEORGE GREY to the meeting of the colliery owners, engineers, and managers of Great Britain, which was held in London in 1850, and of which the late Mr. NICHOLAS WOOD was chairman; but that it originated at this meeting, and was ultimately accepted by Sir GEORGE GREY as a kind of compromise with the opponents of the bill.

The importance of these words were fully appreciated by that meeting, and experience has shown that they have greatly tended to diminish, if not to nullify, the stringency of the whole rule. Various versions have been given of the meaning and application of these words; among others, it has been contended that the words "under ordinary circumstances" limits the ventilation to the every-day requirements of the mine, and that it does not need any special provision for a sudden influx of fire-damp, consequent upon a decreased atmospheric pressure, falls from the roof, or from any other cause. That, in fact, so long as the ventilation is maintained below the explosive point, under the *ordinary* circumstances of the mine, the obligations imposed by the first General Rule have been duly observed. Should a sudden influx of fire-damp occur, which is of common occurrence, and an explosion ensue, it is held to be an extraordinary circumstance, and the unhappy manager is held up as a deserving object for public sympathy. Whenever a disastrous explosion occurs, and the first tidings of it appears in the newspapers, it is now-a-days invariably supplemented by a statement that the colliery in which it occurred was one of the most skilfully managed and best ventilated mines in the country.

Coroners and coroners' juries read the law, as has been stated, and their verdicts, without one exception, assure the public that there has been no infraction of the rules, that the explosion was caused by some extraordinary circumstances not cognisable by the law. With this assurance, the excitement of the public subsides, until it is again aroused by another appalling explosion, when the same forms of enquiry are gone through, and a like result ensues.

The experience of seventeen years unquestionably demonstrates, however, that something more is required than the omission of three words in the first General Rule, and we regret to observe there is nothing in this report that promises anything like a remedy for the existing imperfect and unsatisfactory manner in which the inspection of mines is performed by the officers of the Crown.

The great object which was sought to be obtained by the Act of Parliament of 1860 was the prevention of accidents in mines by an organised system of inspection, authorised and under the control of the Government. Prevention, not punishment, was that which was sought to be achieved by the appointment of official Inspectors, and full powers were given to them by the Acts of Parliament for this express purpose. In clauses 16 and 17, it is enacted that—

"It shall be lawful for any Inspector to enter, inspect, and examine any coal mine, &c., and the works and machinery belonging thereto, at all reasonable times, &c., and to make enquiry into and touching the state and condition of such coal mine, &c.; and the ventilation of such coal mine, &c., and the mode of lighting, or using lights in the same; and into all matters and things connected with or relating to the safety of the persons employed in or about the same; and especially to make enquiry whether the provisions of this Act are complied with in relation to such coal mine, &c.; and the owner or agent of such coal mine, &c., is hereby required to furnish the means necessary for such entry, inspection, examination, and enquiry. If any Inspector find, on such inspection, &c., any mine, &c., or any matter, thing, or practice, in or connected with such mine, &c., dangerous or defective, so as in his opinion to threaten or tend to the bodily injury of any person, such Inspector shall give notice in writing to the owner or agent of such mine or colliery of the particular grounds on which such Inspector is of opinion that the said mine, or any part thereof, or any other of the particulars aforesaid, is dangerous or defective, and shal also report the same to one of Her MAJESTY'S Principal Secretaries of State."

These extracts clearly prove that the prevention of accidents and the saving of human life was the chief object of the Legislature in conferring such powers on the Inspectors, and no unprejudiced reader can doubt but that it was the intention of Parliament that these inspections should be thorough and frequent. On recurring to the report of the Select Committee we find that the Inspectors entertain very different views of their duties; and, what is worse, carry those views into practice:—

"The Inspectors are of opinion that the present number of twelve Inspectors is sufficient for carrying out the Act as it now exists. It is not contemplated that they should act as the viewers or managers of the collieries, but that they should be in the districts, that matters may be referred to them; and that upon accidents occurring which appear to be of a nature to require it, or upon removable danger being reported to them, or their having reason to suspect danger, inspection may be made, and the requisite steps taken to enforce the provisions of the law. Such investigations press the responsibility of the management upon the only parties to whom it attaches, and produce good effect by causing precautions to be taken which are likely to prevent a recurrence of accidents. If the view taken by some persons that inspection should reach further than this, were acted upon, it would tend to relieve the owners and managers of mines of the responsibility which now devolves upon them, and to throw it upon the Government, which, unless the Inspectors were made as numerous as the managers, and had an equally numerous staff, with power of control over the expenditure, they could not possibly undertake. The ventilation of coal mines requires hourly supervision, and, notwithstanding all the care and attention that can be bestowed, serious accidents will, we fear, occasionally occur. The responsibility must rest somewhere, and if it is intended to place it on the Government, then the whole subject will require reconsideration."

This is a most remarkable document, and, as far as it well can, attempts to establish the "do nothing system," whilst at the same time it accounts for the failure of the Inspection Act, and the lamentable continuance of the evils that Act was meant to mitigate, if not to remove altogether. It is nothing short of marvellous to see men of presumed intelligence, and professional ability, thus misconstrue the plain and unmistakable meaning of the Act of Parliament. The "opinions" are so transparent, so illogical, so devoid even of common sense, as to be utterly unworthy of serious refutation, save that which is furnished by the Inspectors themselves. The Select Committee give a few instances of the results of this "do nothing system," which admirably illustrate its results.

Mr. DICKINSON'S evidence:—

"It does not, however, appear that these complaints made to Mr. DICKINSON are numerous, they not exceeding 12 to 20 in a year, but they are usually understated rather than overstated." "It is fully possible, under existing Acts, that a pit should exist without being inspected for several years."

Mr. EVANS'S evidence:—

"The air-ways I found to be in a wretched condition—very long and much contracted; the quantity of air was very small, not sufficient for the safety of the mine under ordinary circumstances." "The general ventilation of this colliery was very defective; preparations were, however, making, and will soon be carried out, to better its position." "Two men lost their lives, entirely from the want of ventilation, and the best use being made of what air there was at command; but here, *as in so many places*, the most primitive modes of working were thought sufficient to meet any emergency that might arise, bratticing being hardly known by name."

Mr. BROUGH'S evidence:—

"The arrangements for the people to get out of this iron bowk, or hudge, were very imperfect; the shaft was not a safe one; the distance from the engine to the pit was far too great; there was almost an entire absence of clear signals, and the machinery altogether was certainly not of the kind that I recommend for winding from a deep and difficult shaft."

Such is the picture of the condition of our collieries presented for our contemplation by the Inspectors, in the seventeenth year of their official existence. And with many more such facts as these before them, they coolly tell us that under "the existing Acts it is possible that a pit may remain uninspected for several years (the Oaks Colliery was inspected only once in 14 years, and that was 10 years before the occurrence of that terrible explosion which destroyed 360 men and boys); and that mines are now inspected only in cases of complaint, suspicion of danger, or neglect of the Act, and on the occurrence of an accident which appears to require it."

The Select Committee significantly report—"Accidents described in the reports of the Inspectors of Mines are sufficiently instructive;" and resolve—"Your committee are of opinion that the visits of Inspectors should be more spontaneous, more frequent, and more searching." In speaking of the Inspector's evidence which has been quoted, they say—"It is difficult to conceive how, under an adequate system of inspection, adequately carried out, such accidents, arising from defects of long standing, could have occurred."

The censure implied in these few emphatic words will meet with a cordial response from everyone in Great Britain whose feelings have been harrowed, and heartfelt sympathies have been excited by the details of those dreadful and ever-recurring explosions in our mines, which annually scatter death among upwards of a thousand of the most industrious of the labouring population, and inflict dire distress upon their widows and orphans. MENTOR.

THE FERNDALE COLLIERY EXPLOSION, AND THE GOVERNMENT INSPECTION OF MINES.

"We are of opinion that the inspection of collieries, as hitherto practised, has entirely failed as a preventive to accidents of this kind; and we recommend that all collieries should be henceforth inspected by a competent person at least once in every three months."

SIR,—Such is the deliberate verdict of a jury of intelligent men, presided over by one of the most impartial and able coroners in South Wales. This verdict is in strict accordance with the evidence, and with the opinions of all disinterested persons whose practice in colliery engineering and professional knowledge enable them to arrive at correct conclusions. The quantity of air going into this colliery was quite sufficient "to dilute and render harmless the noxious gases" in this mine, had it been properly "coursed," or directed through, "all the working places of the pits, levels, and workings, and the travelling roads to and from such working places," as is required by the first general rule of the Inspection Act. From the evidence given at the coroner's inquest, which confirms the rumours prevalent in the district among those most conversant with such subjects, it is evident that the explosion occurred, not from the want of the means of prevention, but from a neglect of properly and efficiently applying those means. This must have arisen from the ignorance and incompetence of the manager. I can come to no other conclusion than this; for had he been competent, and known the consequences that would inevitably ensue on his neglect, it would have been an act of madness on his part to allow the atmosphere of the mine to become explosive when he had the means of prevention at his command. In this, as in most instances, the immediate cause of the explosion is attributed to the fact of some of the colliers having removed the wire gauze from their safety-lamps. This is, probably, too true. Such a practice is, unhappily, by far to prevalent among this very ignorant, unthinking, yet industrious class of men. But this is no secret. It is patent to every colliery engineer in the kingdom. The notoriety of such a practice, therefore, renders it the more imperative that the atmosphere of every mine should be kept far below the explosive point. This is not impracticable, as has been repeatedly proved before parliamentary committees by colliery engineers of great experience and scientific attainments. Were an Act of Parliament passed making it obligatory to close all mines the atmosphere of which could not be rendered non-explosive, we should very soon see a wonderful diminution in the loss of life in our mines. Some such stringent measures must be resorted to if the wholesale destruction of the poor ignorant colliers is to be averted.

Government inspection has been tried, and signally failed. During the seventeen years three Acts of Parliament have been in operation the killed and wounded in our mines have increased, and are increasing, whilst each successive explosion has become more and more destructive. Nor is this a matter for surprise, when it is known how these Acts are administered, and with what ease and dignity Her Majesty's Inspectors discharge their onerous duties. A report from the Select Committee of the House of Commons on Mines, which was ordered by the House to be printed on July 31 last, throws some light upon this important subject. The object sought to be obtained by the appointment of Inspectors was the prevention of accidents, and the means by which this was to be achieved were a frequent official inspection, so as to enforce the observance of all measures necessary for the safety of the workmen, and to report to the Secretary of State all cases in which the safety of the mine was not duly secured, or the General and Special Rules not strictly observed.

In the report the Inspectors gave a very different version of the duties which the law imposes on them, and on the due and thorough discharge of which the lives of thousands of men daily, nay, in some cases hourly, depend. "It is not to be contemplated," they say, "that they should act as the viewers or managers of the collieries, but that they should be in the districts, that matters may be referred to them, and upon accidents occurring which may appear to be of a nature to require it, or upon removable danger being reported to them, or their having reason to suspect danger, inspection may be made, and the requisite steps taken to enforce the provisions of the law." "These "opinions," the report states, "expressed by the Inspectors in evidence, are recapitulated in a letter, addressed, Jan. 26, 1867, to the Home Secretary, at his request, by the Inspectors at a meeting held on Jan. 23, 1867."

In addition to this joint opinion of all the Inspectors, we have the following individual "views of their duties" from two of them:—"Mr. Evans says that, in case of complaint, or reason to suspect danger or neglect of the Act, mines are now inspected, and are also inspected on the occurrence of any accident which appears to require it."

"Mr. Dickinson states, in answer to questions, that the Inspectors do not feel it their duty to visit mines without being summoned in consequence of any accident or from any complaint; and they do not go into a mine without a special reason, such as the character of the manager, or information leading to suspicion." The Committee add—"It does not, however appear that these complaints made to Mr. Dickinson are numerous, they not exceeding 12 to 20 in a year." "It is fully possible, under existing Acts, that a pit should exist without being inspected for several years." Mr. Dickinson might have aptly illustrated his "views of his duties" by adding that the Oaks Colliery had only been inspected once in 14 years, and that was ten years before the occurrence of the explosion, by which 361 human li ves were lost.

With such a system of inspection as now exists, it would be unreasonable to expect any diminution of the loss of life in our mines, or to blame the law for its inefficiency. So long as the views, ease, and personal comfort of Her Majesty's Inspectors are paramount to all other considerations, so long must we be content to bewail the ever-recurring "accidents in mines" which annually inflict death and misery upon thousands of men, women, and children.

Neath, Dec. 31. —— J. RICHARDSON, C.E.

COLLIERY EXPLOSIONS.

SIR,—It is said by some that colliery explosions cannot be prevented. If this is true, it is sad indeed to contemplate that, in addition to the constantly recurring deaths from other causes, the world must go on for an indefinite period sacrificing whole hecatombs of victims of those who are to be employed in getting an article which, perhaps, more than any other administers to its wealth. But is this the case? Must science confess its inability to prevent it? If our collieries were deluged with water we would pump it out, and certainly gas, although much greater in volume, is much less in gravity, and it may be also removed. It seems to me that our system of working colleries is defective, inasmuch as we direct our energies more to the securing of the smaller safeguards to life than we do to the proper laying out and continuous systematic arrangements of the ventilating shafts and other appliances for clearing away the coming gas to prevent accumulation.

In laying out collieries, and in after working, it should be imperative that sufficient air should be distributed through them to render them free from danger with the use of naked lights in ordinary times; and if blowers of gas should suddenly occur, a sufficient ventilating power should be available to send a storm of air through the workings at once, and indeed, every night in the absence of the men this power should be applied to purify the workings before the men resumed their work. In attending to the evidence given at the coroners' inquests after the dreadful explosions which have resulted in the greatest loss of life, it will be seen that in every case the workings have been extended a great distance from the ventilating shafts, in some instances from one to two miles opening a large acreage of exhausted coal. Now, this exhausted field, by the numberless fissures, which evolve carburetted hydrogen from long distances into the measure at work, as well as from other measures above and below, by the constant evolution of gas from the waste coal and gob and the face of coal at work, constitutes a gasometer or reservoir of extending area, in no part of which should a calm stagnation of atmosphere be allowed. The upcast shafts should be put down on the rise of the measures, by which the carburetted hydrogen, being very much lighter than atmospheric air, would pass readily upwards. The number of shafts should also be increased as the workings were extended, thus obviating the necessity of returning the explosive mixture to the first upcast shaft. These arrangements would also lessen the amount of friction or drag, greatly facilitating the passage of the air required.

The question now being discussed, whether the furnace or mechanical appliance is the best for ventilation, is not of so much moment as a free delivery of air, for either of these may be effective if adequate air-shafts and passages are provided and properly placed. But will it pay to work collieries thus is another question. To this I answer, it will; for the improved facilities for working, and the diminished risk of the lives of the employed, would greatly cheapen the cost of the production of coal, and would, I think, fully balance the costs of sinking additional pits. But whether or not, it is no less the duty of coal proprietors to adopt every possible means to increase the security of their workmen, and of the Government to compel their observance, if it cannot be done otherwise.

South Wales, Dec. 31. —— A MINING ENGINEER.

PREVENTION OF GAS EXPLOSIONS IN COLLIERIES.

NO. II.

SIR,—Drawing attention to the consideration of arrangements which are believed to have the tendency of preventing, or, at the least, palliating, those dreadful calamities can only tend to produce good results; and having nearly seven years ago, and again in last week's *Mining Journal*, called attention to what I consider a very simple, feasible, and effective remedy, founded on principles universally acknowledged to be sound, I now take the liberty of adding a few more explanatory remarks.

The efficiency and practical utility of the Davy lamp is not and cannot be questioned; and in the system I propose I claim no other merit but that of having suggested that the principle of the safety-lamp be taken advantage of for the purpose of promptly indicating the presence of danger, and of assisting in removing the cause of the danger, and as an auxiliary in the ventilation of the workings. It is well known that the fact of the flame of a safety-lamp not setting fire to the fire-damp by which the lamp may be surrounded is owing to the metallic wire which forms the enclosing gauze (metals being rapid and ready conductors of heat) rapidly absorbing the heat; and, for the same reason, the wire gauze loses its property of isolating the flame as soon as—perhaps, owing to a *lateral* draught—it gets *red hot*, for by the gauze getting red hot the lamp at once ceases to be a safety-lamp, and the surrounding fire-damp would at once be

ignited, and an explosion ensue. For this reason—and as obviously any stationary safety-lamps, being many times larger than the ordinary Davy lamps, would contain a larger flame, or a number of flames, burning within the *inner* gauze of each one of those apparatus, in order thus to enable them to do more efficiently the work of *ventilators*—I would furnish each of those safety-apparatus with a *double* covering of wire gauze, in such a manner that the outer surface of the inner lining of wire gauze would be a few inches distant from the inner surface of the exterior lining of wire gauze; so that, even if the inner lining should get red-hot, there remains the outer *reserve* wire gauze casing as a guarantee against explosion. But with my arrangement it would be almost impossible for even the inner wire gauze ever to get red hot, because it should be borne in mind that the heated air and burnt gases are continuously being led away to the surface of the mine by means of the conducting tubes or pipes, the *intake-mouth* of each tube being inserted into a non-conducting, conical cover of the safety-apparatus, in such a manner as to be only in direct communication with the *inner* part of the lamp, where the *burners* are situated. As now, by means of these pipes, or tubes, the heated air and burnt gases are continuously being withdrawn, and as, besides, the apex of the flame of the burners, being the point of its greatest intensity of heat, would obviously be constantly pointed parallel with the direction of the draught—towards the mouth of the intake-pipe at the top of the apparatus, any lateral draught and over-heating would simply be impossible. But when surrounded by fire-damp it is very probable that after a little while the flames would become extinguished, and then the dangerous gases would have to be drawn off through the same pipes, by mechanical arrangements, at the surface of the mine. If, however, it be considered preferable that the burners in the safety-apparatus should continue burning, and that by this means the danger be safely, though gradually, removed, then we should have to arrange another set of smaller pipes, or tubes, by means of which we would lead to each burner an amount of atmospheric air just sufficient to keep its flame alive in the midst of the fire-damp. You will perceive that wherever a system of safety apparatus, such as I have attempted to describe, is in existence, there the gradual accumulation of fire-damp will be impossible, while the occurrence of blowers would be at once promptly indicated by the more rapid rush of heated air through the draw-off pipes all over the workings, when, of course, all the men ought to be withdrawn; and then the respective stationary safety apparatus being kept burning by means of the atmospheric air, led to their flames through the pipes above alluded to, we may safely leave it to the action of our apparatus to dispose of all the fire-damp which may exist in the workings; and, when the subsidence of the violence of the burnt gases rushing through the upcast tubes indicates a subsidence of the danger, we might safely enter the workings again without fearing to encounter *choke-damp*, because the fire-damp could only burn within those apparatus, and all choke-damp resulting from its combustion has been led away through the upcast tubes as soon as formed. The volume of fire-damp to be disposed of by my system in a given time would be proportionate to the number and size of those safety apparatus, to each one of which a certain radius of the space of the workings would be assigned, a larger number and larger sized apparatus being placed in such spots where there is known to exist a greater danger from blowers. G. J. GUNTHER.

London, Dec. 31.

NITRO-GLYCERINE.

SIR,—No person can regret more than we do the awful calamity which has taken place at Newcastle; but the notice taken of it in the Journal, and the assertions made with the full weight of your authority, have greatly surprised us. It is asserted that Nitro-Glycerine has no advantages, and is valueless in a commercial sense, and that it is more dangerous than gunpowder; and the article concludes by referring to a suggestion (which we never before heard of) that when congealed it may be rendered safer by warming it before the fire, and which, it is added, should be adopted with as much caution as a proposition to "keep your powder dry" by storing it in a well-heated furnace. We concur in the last remark. [See precaution 6 of our printed instructions.] The utility of blasting oil in a commercial sense, is best known to those who use it, and is proved by the increasing demand, and by the fact that in some quarries the men, who pay for it themselves, make their bargains dependent on a supply being guaranteed by the quarry proprietor. As to the dangerous character of the article, tons are annually used in the largest quarries in this neighbourhood, and a larger amount is expended on it in some quarries than on gunpowder; and, though accidents are constantly occurring from the use of gunpowder, yet we have heard of two only arising to quarrymen from the use of nitro-glycerine, and each of them were occasioned by gross negligence and a total disregard of the printed rules laid down for its use. In one case a man held a tin can containing crystallised oil over the smithy fire until it was overheated, keeping the cork in the tin; and in the other case the man drilled a hole in hard rock within 2 or 3 in. of one already charged with oil, knowing that the latter had not been fired:—

4.—Never use hard tamping, and never leave a charge unexploded.

In the quarries with which we are immediately connected two fearful accidents have occurred from the use of gunpowder within the last five months. In one case a spark from a match fell on some loose grains, which served as a train, and fired the blast before the man had time to get away, and he was buried in the debris, and taken out with fractured skull, broken arm, and other fearful injuries; and in the other a quarryman of great experience, in attempting to remove the tamping from a hole after a misfire, was blown up by an explosion, and sustained a compound fracture of the leg, and other injuries. Last week, only, we had two misfires at the same time, and in the same tunnel, in holes, one of which was charged with gun-cotton, and the other with nitro-glycerine. The gun cotton was, in accordance with the directions of the manufacturers, abandoned. It was too dangerous to attempt to recover it. We lost the man's labour in drilling the hole, and the charge itself, and had to prepare another blast in a less suitable position. In the case of the nitro-glycerine we simply removed the defective fuse, and substituted another, passing the percussion cap through the water tamping, without the slightest risk or difficulty, and fired the blast, which did its work effectually. With such experience, and numerous other instances constantly brought to our attention by the managers of other quarries, we are confirmed in our belief, and justified in our assertion, that nitro-glycerine is not so dangerous as either gunpowder or gun-cotton, if reasonable and ordinary care be observed in its use.

As to the Newcastle accident. Mr. Mawson, the late sheriff, who appears to have directed all the proceedings, had and perused our pamphlet before he took his fatal journey to the Town Moor, and the following are extracts from it:—

The power of the blasting oil is enormous. A single discharge is conclusive, and at once removes all doubt.

13.—If prepared in an explosive state it crystallises at from 43° to 45° (Fahr.), but resumes all its properties when melted. If prepared in an inexplosive state state it will not crystallise.

PRECAUTIONS TO BE OBSERVED.

6.—In cold weather blasting oil crystallises, and should be melted by putting the oil canisters into hot water, taking care to remove the cork. Never attempt to heat it on a stove, or at a fire; it is dangerous to do so.

7.—Do not allow the unpacked canisters to receive a blow, or fall. Strong concussion is dangerous.

8.—Do not strike the crystallised blasting oil with a hammer. It is difficult to explode it, but, unlike the fluid oil, the whole will go off, and not the part only which comes in contact with the hammer.

It is in evidence that, in total disregard of the above, Mr. Mawson caused sub-Inspector Wallace to break open, and remove with a spade, the tops, which were strongly soldered down, from three tin canisters, each of which is said to have been half-full of crystallised oil, and, if so, must have contained about 14 lbs., they being 28-lb. canisters. The blows and force used must have been very great; and the mystery attending the transaction is that Wallace is now a living witness of the truth of the statement that crystallised oil is difficult to explode, but that when part explodes the whole will. No living person saw what took place at the fatal spot where the accident occurred, but there can be little doubt that the tins containing the crystallised oil were thrown into the hole which had been dug to receive them, and that the blow from the force used, and the heavy weight of one striking against the other, caused the explosion. Such treatment of a tin canister, containing nitro-glycerine, can only be compared to putting a lighted fuse into a barrel of gunpowder.

We scarcely like to speak of the conduct of Mr. Mawson, who appears to have been highly respected, and has paid so dreadful a penalty for his imprudence; but if he had only obeyed our printed instructions and precautions, or allowed the oil to be removed to one of the collieries, where it was known and used (which, we understand, was suggested, but not allowed to be acted on), or had treated the nitro-glycerine as having been forfeited under the provisions of the Dangerous Goods Act, 1866, and allowed it to "be disposed of in such manner as the Commissioners of Her Majesty's Treasury should direct," the lives of himself and the other sufferers would have been spared.

If persons using or having in their possession blasting compounds, no matter whether gunpowder, gun-cotton, or nitro-glycerine, will act in open defiance of all rules for their protection, accidents must occur, and they must take the consequences; but to prohibit the use of such compounds is impossible. We cannot stand still while our neighbours avail themselves of modern improvements. How many lives have been sacrificed from the negligent use of steam during the last twelve months, or even since the Newcastle catastrophe, and how many from explosions of fire-damp in mines? Yet who would desire to prohibit the use of one, or have the working of the other stopped? WEBB AND CO.

IRON PYRITES.

SIR,—In the very interesting account of Iron Pyrites, which appeared in last week's Journal, Dr. Phipson, remarking upon the production of sulphur from pyrites, says—"Now, if at this stage vapour of water is passed over the residue, the remainder of the sulphur is eliminated as sulphureted hydrogen, a discovery due to M. Charles Méne, which may some day be turned to account." Dr. Phipson is evidently not aware that a patent for this very process was taken out in the year 1843 by Mr. J. E. D. Rodgers, then Professor of Chemistry at St. George's Hospital School. I assisted Mr. Rodgers in his experiments, and paid the cost of the patents; but, as with nineteen patents out twenty, the result was "no returns," although I had much correspondence with the late Mr. Pattinson, of Newcastle, and other manufacturers and chemists at the time. Dr. Phipson observes that iron pyrites is nowhere abundant in one spot. He, however, himself mentions the Pomaron Mines, in Portugal, from which 80,000 tons of pyrites at least can be raised annually, and this is but a continuation of the line of pyritous veins of Huelva, in Spain, which are capable of yielding enormous quantities, the production being limited rather by the cost than any lack of material. In Norway, also, there are many very large and productive veins of iron pyrites, some of them now working profitably. At Varaldso, one of the veins is more than 20 feet wide, of solid pyrites, which is esteemed for being remarkably free from arsenic. Like the Pomaron pyrites, it contains a small percentage of copper. JOHN PHILLIPS.

Epsom, Dec. 30.

NORTHAMPTONSHIRE IRONSTONE.

SIR,—Referring to the article on "Northamptonshire Ironstone," in the Journal of Dec. 21, I notice some of the remarks there made are incorrect. May I ask you to correct them in next week's Journal? It is stated that "the ironstone is similar in richness and colour to the Lincoln ore, yielding 35 per cent. of iron." This is not correct. The Lincolnshire is more or less calcareous—the Northamptonshire is more or less silicious, and yields an average of 40 per cent. in the furnace; indeed, we have one quarry where the ore has given 45 per cent. for months together. On referring to the works on the Midland station—our new ironworks—it is stated, "These works are very complete, and have been admirably laid out under the superintendance of Mr. Brown, the engineer and manager."

Permit me to say that I am the engineer and manager. The works were laid out by me, the whole plant and machinery made and fixed by me. It is only fair, however, to state that Mr. Brown, who was one of my engine fitters from the Northampton Engine Works, fixed the engines and machinery, under my direction, without a single misfortune or accident to either materials or men.

Sheep-street, Northampton. WILLIAM BUTLIN.

GOLD, SALT, AND SULPHUR MINES IN CANADA.

SIR,—Information from Madoc, the last week in November, says:—A blast yesterday in the Richardson Mine developed one of the richest shows of gold yet made, even in that rich location. Some of it is on exhibition at the store of Mr. James Glass, in Belleville, who was at the mine when the blast was made. The rock thrown out by this blast is conglomerate, composed of bitter spar, lignite, quartz, and iron pyrites, in all of which the gold is very richly diffused. The Rose Mining Company, chiefly persons resident in the city of Hamilton, have acquired property at Madoc in a favourable location. Mr. James Carr Ritchie, son of the postmaster at Hamilton, is secretary, and several of the most substantial and well-respected men in the city are directors, including local residents at Madoc. I specify Mr. Ritchie's name and address in case any British capitalist may desire to communicate with a thoroughly respectable gentleman for investment. Prof. Wyckoff, the scientific assayer at the mines, is a director of this company. Gold and silver have been found in paying quantities on the lot, which is No. 10, in the eighth concession of Madoc.

Since I last wrote to the *Mining Journal*, Prof. Bell, of Queen's College, Kingston, an eminent man of science, has assayed pieces of rock from lot 4, concession B, of the township of Barrie; the quantity was 9 ozs. It is described in his certificate as a grey silico-calcareous rock, and yieldiag one grain and one-sixteenth of a grain of free gold, equal to $225 per ton.

Nine tons of rock, taken from various shafts in different parts of the township of Madoc (a township is 12 miles square), which had been reduced at the works of Scott and Taylor, general crushers, averaged in the yield of gold $72·86 per ton. These parcels are stated thus, in proof of the general diffusion of the metal over wide tracts.

The Empire Mine, in the village of Madoc, is reported thus:—"The copper in the tailings, without any further manipulation than simply barrelling it up, would be worth fully $40 per ton. The proprietors have 100 tons of this rock quarried already from their two shafts, and are making arrangemements for the erection of a crushing mill as soon as possible." The tailings here named is the refuse debris, after gold is extracted.

In El Dorado Mine two shafts are down, and 500 tons of gold-bearing quartz brought to the surface, awaiting the completion of the crusher. A portion, tested at Scott and Taylor's mill, yielded $53·80 to the ton. Allowing all over $40 per ton to go for expenses of crushing, this mine will return 30 per cent. of the entire capital expended on its purchase and working, out of the 500 tons alone. This is a Toronto company. I may name Alderman Vickers, of Yonge-street; Mr. Ellis, goldsmith, King-street; and Mr. Kersteman, 62, Church-street, all in Toronto, as respectable and substantial gentlemen interested in the property, with whom strangers at a distance may communicate.

The Toronto Madoc Gold Mining Company is another, located near El Dorado. They have obtained an average of $22 per ton, but are not in full operation.

The Empire Mine, located in the rear of the Madoc Flour Mills, has yielded $34·76 per ton, and considerable silver.

The Barry Mine, at Madoc, is one of the richest yet opened. It is owned chiefly by one person, Mr. C. Strong, of Port Hope. He has erected a crusher, and is getting gold largely; but, not desiring to sell shares, he seems to keep the real value of the vein within his own mind.

It may be proper to remark that many persons have visited Madoc to obtain lands for speculation merely, and having failed to acquire them, go abroad with a cry of depreciation. But, happily, all these misrepresentations, intended to injure honest enterprises, are now practically overcome. A steady and remunerative industry is in process of being firmly established.

A too early winter prevented my visit to Madoc in November, but now that frost has come, and snow is falling thick, we shall soon have the best of roads on the face of the earth, and in sleighs go coursing over the hard level snow, crossing marshes and rivers on bridges of ice, and enjoying the brilliant, enlivening, healthful atmosphere. I propose going to the mines then.

SALT WELLS AT GODERICH.—Goderich is a town on the Canada shore of Lake Huron. Four years ago, when petroleum wells were more remunerative than now, a company in that town bored for oil. In descending, strata of salt and brine were penetrated; these were shut off, and, still looking for oil, the adventurers proceeded until a depth of 1200 feet was reached. The desired material was not found. The disappointed shareholders bethought them of the salt. In the Saginaw Valley, State of Michigan, on the opposite shore of the lake, salt mines were being worked beneficially. Well, this at Goderich was re-opened for brine—it flowed abundantly. Works were erected for its reduction to salt—the returns have been highly profitable. Another well was sunk, and two months ago the precious brine and a stratum of crude salt, almost pure, were penetrated at nearly the previous depth of 1200 feet. Salt meets a ready market, the more so now that the United States have abrogated the Treaty of Reciprocity, and imposed a duty on live beasts imported from Canada into the United States, intending the duty to be a screw upon the people of Canada to impel them to seek annexation with the Republic; instead of which result, the Canadians have established manufactories for curing beef and pork. They before sold hogs and oxen to the American curers—now they purchase live animals from the States, killing and salting the meat in Canada for exportation. The discovery of salt deposits, seemingly illimitable in extent, has been a happy occurrence.

SULPHUR abounds in Canada. Two chemical manufactories have been recently established to make sulphuric acid, which is used in the oil refineries, and other industrial arts, such as the making of paper from straw and flax fibre. ALEX. SOMERVILLE,

Hamilton, Ontario, Dec. 13. ("The Whistler at the Plough.")

GOLD IN NEW ZEALAND—THE THAMES GOLD FIELDS.

SIR,—As the discoveries of the gold fields in the neighbourhood of Auckland, New Zealand, are assuming great importance from their anticipated large yield, and as one greatly interested in New Zealand, I have collected together some information on the subject, which I think cannot fail to prove interesting to many of your readers.

The *Daily Southern Cross* of Oct. 2 states that—

The Thames gold field is being slowly developed as a quartz reefing district. Gold is beginning to come to town from the reef claims, and when proper machinery is on the ground no doubt the yield will be considerable and regular. As yet gold in paying quantities has not been found in the wash-dirt. By steady industry and perseverance, we do not doubt that many men will do well on the Karaka field. About 600 miners' rights have been issued. In one instance (from Hunt and Co.'s claim), 68 ozs. 14 dwts. of gold has been obtained by crushing from 6 cwts. 45 lbs. of quartz, and as this is a yield equal to 193 ozs. 13 dwts. of gold to a ton of average quartz, it fully establishes the richness of the prospectors' claim, and leaves us no longer in doubt as to the value of the Thames quartz reefs. It is calculated that six men can take out about 30 tons per week from this claim.

The *Auckland Weekly Express* of Oct. 5, says—

The news from the Thames gold fields since the commencement of the week up to the present time has been very satisfactory. On Monday the steamer Midge brought up 157 ozs. 6 dwts. from Barry's claim. The gold was forwarded to Sydney by the steam ship Auckland to be assayed, and the result will be known in Auckland by the close of the present month. There is a very large quantity of stone on the ground now ready to be crushed, and when a sufficiency of capital, labour, and machinery can be brought to bear upon the work in hand, the result will be such, if we may judge by the evidence before us, as to give additional confidence to capitalists to embark in the undertaking. The small Berdan machines now in use are hardly powerful enough for the work.

Williamson's claim, on the Monatairi, has turned out to be a very rich one indeed. They have a good deal of stuff stacked ready for the machine which is coming down, and, indeed, the sooner it comes the better, for there will be such a large quantity of stone in a few days that a small machine will never be able to crush it all so as to pick up and get "square."

The *Daily Southern Cross*, of November 2, states that—

The Thames gold field progresses steadily. Several of the quartz claims worked show unusual rich stone. The great drawback has been the want of machinery. However, several quartz-crushing machines are being erected, and by next month more substantial results will be noted. Upwards of 1000 ozs. will be shipped to Sydney from the Thames, by the Claud Hamilton, to-day. Of this quantity, 600 ozs. come from Hunt's reef; 270 ozs. is from Barry's reef, hand-crushed, and the result of six men's labour for two weeks, working eight hours daily. We hear of several new finds. Upwards of 4000 men are now on the gold field, and Shortland Town is a busy trading place. The result of an assay conducted at the Sydney Mint, on the parcel of 407 ozs. of gold from the Thames gold field, forwarded by the last trip of the screw-steamer Auckland. Of the gross amount exported, 309 ozs. were forwarded by the Bank of New Zealand, and 85·05 ozs. by the Union Bank; and we are indebted to the Union Bank for the following copy of the purchase-ticket:—

Royal Mint, Sydney, Oct. 14, 1867.—Memorandum of the particulars of a purchase of gold bullion from the Union Bank, the value of which has this day been ascertained. Date of deposit in the Mint, Oct. 9, 1867:—

			Ounces.
Weight before melting			85·05
Weight after melting			85·05
Assay report of fineness:—			
Parting assay gives—Gold		·589	
" " Silver		·397 =	·986
Standard weight			54·647
Value, at £3 17s. 10½d. per oz.			£212 15 8
Mint charge, at 7d. per oz.			1 11 11
Nett value	(£2 9s. 8¼d. per oz.)		£211 3 9

W. GIBSON, for the Deputy-Master.

It will be seen from the above return that no allowance whatever is made for the silver alloy contained in the gold before being assayed, and which, we understood, may be accounted for from the fact that no process has, up to the present time, been discovered for saving the silver. A serious loss, it will be seen, is thus sustained; and which will be admitted when it is remembered that the export charges are based upon the assumption that the gold is pure.

A private correspondent writes from Auckland, Nov. 2, that it is difficult to ascertain the truth about the gold field; but he believes that there is plenty of gold to be got in quartz leaders; that no regular reef has been found; that about 1000 ozs. have been exported to date, the produce of the Thames gold field; and that from the want of proper machinery there is a quantity of auriferous quartz waiting to be crushed, which, it is estimated, may produce about 60,000 ozs. (value about 2*l.* 10s. per oz.) Another, writing to me from the Rosebud Estate, Great Barrier Island, expresses a belief that the Great Barrier Island, which is identical in its geological features with the main land, will shortly be proved to possess gold-bearing reefs; in fact, on the authority of "an old Victorian Digger," he fancies he has discovered one.—26, *Gresham-street.*] PARKE PITTAR.

WEST OF IRELAND.

THE MINERAL AND OTHER RESOURCES OF THE CURRUAN ESTATE.

SIR,—At such times as these it will, doubtless, be interesting to many of your readers—especially those at all acquainted or familiar with the really metalliferous lode-bearing districts of Ireland—to hear of anything likely to give employment to several hundred men. The mineral-producing prospects, however, of this estate being known only to a few may make the following account—which I write from a week's exploration on the estate made during this month—still more acceptable. The estate is situated in the county of Mayo, about 25 English miles north-west of Westport, from whence it is approached by an excellent road. It is nearly surrounded by the sea, the exception being a neck of land which is about ¾ mile across, separating Trawoughter Strand from the Bellacragher Bay. Clew Bay confronts the estate to the south. Achill Sound and Achill Island immediately to the west, the former extends inland from Clew Bay, in a serpentine manner, for upwards of ten miles, varying in width at high water from 100 yards to a mile. At the entrance of the Achill Sound from Clew Cay the Achillbeg Island will be found, with the Island of Clare lying four miles further south in Clew Bay.

Curruan estate embraces nearly 8000 acres, the geological formation of the west and southern portions consisting chiefly of a peculiar class of mica-slate, with a few beds or deposits of inferior clay-slate, both of which are accompanied in various parts along the beach by numerous semi-crystalline beds of highly gneisose varieties, in all of which the mica is most interestingly displayed in a laminated form, the colours varying from the well-known silvery grey, in all tints and shades, down to black; in fact, the whole formation, from Rdsd point around the cliff to the old mine working at Benderg, a distance of three miles, may be considered, from the crystalline form the rocks take, to consist principally of inferior syenite, true gneiss, with a variety of gneisose and mica-schists rocks, all of which, at various points, are disturbed and contorted by the upheaval and pertusion of four igneous rocks and greenstone dykes, varying in thickness from 6 ft. to 50 yards, having various declinations and bearings. The smallest of the four known dykes is very highly cyrstalline. In this may be seen beautiful crystals of black hornblende and rose-red felspar, with specular iron pyrites regularly disseminated throughout the dyke, giving the rock (samples of which may be seen at the company's office in Dublin) a truly ornamental aspect

In going eastward from the Benderg adit level the rocks run into

a grity and micaceous sandstone, and ultimately the true red sandstone, towards Westport, where this and the carboniferous limestone may be seen well developed. The mineralogical prospects of the estate, especially in the vicinity of the before-mentioned dykes, are of a most promising character. The parts of this sett herein referred to bear six metalliferous lodes, varying in width from 3 to 20 feet; the latter lode appears (at least where seen at surface) to consist mainly of four beds of nearly pure sulphuric mundic, the largest being about 8 ft. wide, the other three varying from 3 to 4 ft., forming collectively a lode of 20 ft. wide. This lode, which is in the vicinity of the largest felspathic dykes, and converging to, may be profitably operated on at once. Should this lode maintain its present value in depth immense quantities of sulphur ore might be sold from it.

I have never seen a lode of this size so entirely free from arsenical mundic, so that it may become unusually valuable, and peculiarly adapted for supplying ore for the manufacture of sulphuric acid. A shaft has been sunk on this lode, a few fathoms from which about 20 tons of sulphur ore was obtained, and is now lying on the bank near the shafts.

On the Benderg lode, which is about 4 feet wide, running north-east and south-west, dipping eastward, an adit level has been driven about 30 fathoms, and two winzes sunk on the course of the lode, about 8 and 17 fathoms respectively, from which several tons of rich sulphuret of copper were obtained from ore deposited along the lode, in the sides of fissures and crevices in the lode, invariably adhered to highly crystallised cubical quartz; this lode, however, being out of the influence of most of the trap-rocks, I should consider the lodes, especially the sulphur, lead, and Starick Inn Creek lodes, among the first calling for and requiring immediate attention, all of these, with others, being in the neighbourhood of the felspathic dykes. The various other resources which this estate embraces, both in land and fisheries, I will describe upon another occasion.

A company, composed of Dublin capitalists, has been formed for the purpose of purchasing this estate, and making available the valuable resources it is known to embrace; among others, there are 149 acres of private oyster beds, granted by the Fishery Commissioners. The produce from the land and fisheries will even now pay over 5 per cent. per annum upon the price paid for the estate. Nearly 3000 acres are still waiting the application of a small amount of capital and labour to bring them under profitable cultivation. When all the resources of this estate are fairly developed, I have no doubt but it will give constant employment in the aggregate, to at least 500 persons, and annually cent. per cent. on the purchase-money, and other capital laid out in improvements. The capital of the company for all purposes need not exceed 50,000*l*. EDMUND SPARGO.

Anglesea, Dec. 31.

DEVON AND CORNWALL MINING.

SIR,—The new year suggests reflection, as sore distress prevails in Cornwall, and as mining prospects are much the same as they were a year ago—discouraging, nay, dark almost to hopelessness. What is needed to cheer mining happens to be what is in request in everything, and it is to this circumstance that there is yet no perceptible silver lining to the overhanging cloud. For mining there seems no present wooing of support, because there is nothing whatever now engaging more than a passing thought. Men's minds are not occupied with gain, their staple entertainment is of a kind with the custom of this festive season. Merchant and clerk hasten to omnibus and rail, as if tens of thousands were depending on their being in Cornhill at nine or ten o'clock; yet, when the office has been reached, the letters read, and the books brought out, there comes home to each the startling truth—that for all practical purposes he might have remained at home. There is really nothing to be done. The books might have continued in the safe and cupboard, and as for the letters they might, but for the look of the thing, have been addressed to the private residence. For a time all seem occupied, and a pin might be heard to drop, when suddenly the old gentleman—the governor—sneezes loudly, and all instinctively gather round him. The sneezing is not once named, but conversation warms gradually about Fenianism, about France and Prussia, about Russia and Greece, about Abyssinia, and, last of all, about the City Articles. In a word, each might as well tell a story, as, just now, is the household custom. Going to the City has become a form—taking hold of anything has become obsolete. Such business as there is proceeds with muffled oars, lest some demon might be let loose on the foolhardy. London, allowing for the difference of population, the omnibuses, and the cabs, is suggestive of the plague, whose horrors were talked of until new ones were produced, that, in turn, gave rise to others. Perhaps the vagabonds who attack prison vans, and blow up prison walls, have the same mission as the Great Fire of London, which roused the City from its stupor, and changed the current of its aims. If so, it, to all appearance, is the only present hope there is that the cash in the Bank of England, the joint-stock banks, and the county banks, will begin to circulate. At present the vital circulating wealth of the kingdom is as congested as Christmas pudding.

The distress in Cornwall, and the gloomy outlook there and in Devon, are assumed by some to show the mining end of Cornwall. It is thought the Cornwall sun has set, that hereafter it will go down steadily, and foreign mines—those of Germany, Canada, Australia, the United States, and South America—take its place in public favour. It is said, as now-a-days we are content to receive hops, wheat, and other things, in enormous quantities, we are sure before long to get minerals in some other form than that of locomotive engines, as imported now. Nonsense. The circumstances of the receiving of locomotives from France are exceptional, the mechanical and other industry of France having been, and being, as depressed as ours. Were French trade and commerce active, inducement would be wanting to undersell English engineers in our own market, and the same arguments that promise the overthrow of English engineering are equally good against English industry in its various branches. In a word, English manufacturing industry is never likely to be swamped by the industry of any nation; the contrary assumption being not only opposed to all experience, but likewise to some of the best ascertained principles of economic law. As to the importation of hops, wheat, and other things, no one can presume to say that we have ceased to grow either hops or wheat, and there is no conceivable connection between such importation and that of minerals; on the contrary, the very reasons that warrant the importation of hops and wheat are in the way of the importation of the minerals that Devon and Cornwall yield. Wheat is imported, first, because it is relatively cheaper abroad than here; and, second, because between the relative prices there is a sufficient margin for the cost of transport. Now, where are these conditions satisfied with respect to tin, lead, and copper? This is a question that the enemies of Cornwall are bound to answer. They may point to Lake Superior, on the shores of which there practically is an inexhaustible supply. But where is Lake Superior? It is far away, skirting the North American Polar Sea, accessible only in the summer months, and involving time and dangers of no common kind. So in much the same degree is it the case with tin and copper in other parts. Nowhere is production possible on anything like equal terms to those of Cornwall. There is distance, there are doubtful titles, unchecked superintendence, and one difficulty and another, that in the other scale, with the nearness, the perfect titles, and the close, satisfactory superintendence always possible in Cornwall, make foreign mining kick the beam. Cornwall, we may be sure, is still the place for English mining, although the Romans, and the predecessors of the Romans, were diggers there. Like the sea, Cornwall still abounds in treasure, and, as in all previous time, capital, skill, and energy are the requirements for its being brought to market.

Distress in Cornwall, apart from distress in London, in Liverpool, and in Glasgow, is no new thing; and assuredly the present sore distress is not the last that Cornwall will have to suffer. Without going back unnecessarily, it may be remarked that the wars of the first Napoleon bore heavily on the Cornish miner, and that notably among the years of suffering were those of the first years of peace. Old men in Cornwall still remember those years as a time with no Poor Law, in the sense of the present Poor Law, and as a period when every family had the burden of its own crushing griefs to think about. Low indeed was the victorious country then brought, and the most sanguine dared not to hope that Cornwall would ever raise its head again. Its enterprise had perished, its mines were neglected, and the bodies of its best miners were strewn on old England's battle fields. But time always has and always will work wonders. The year 1819 trod closely on the heels of 1816, and its great harvest diffused universal gladness. Rich and poor joined in grateful thanks to Him from whom all blessing comes, and once more the Cornish miner began to pick up crumbs. By 1825-6 all traces of the Napoleonic wars, and of the peace reaction, had not only ceased, but a stupendous mining mania had gradually been set on foot. Towards Cornwall and Devon mining a full share of the newly-formed wealth of the kingdom was now turned, and what should not at present be overlooked is the fact that this diversion of newly-formed wealth met with its reward. For a space of 20 years Cornwall and Devon prospered as, perhaps, they had never done before, and wages ruled 1*l*. a month higher than now and during recent years. The past despondency was forgotten and the past ruin retrieved by fortune. What, therefore, now exists is not new. Over Cornwall the blackness of darkness has reigned before, but in time that darkness has given place to glorious light. And such will be the case again; nay, many times again. It is an infirmity of our nature to alternate between buoyancy and despair, and just now we are merely wretched because those about us, and all about us, are wretched likewise.

The present condition of Cornwall is sad indeed. For the time its hard-working, honest miners are in the eddy of the stream—castaways, in fact, superseded even in soberest truth. No one needs them, and, therefore, no one seeks them. And, having no weekly wages, and no resources on which they can draw, their condition may be more easily conceived than described. They are in the depths of poverty—able, willing man, and yet without the opportunity to earn bread to eat. For their relief local appeals of the usual kind are made, and philanthropic persons furnish partial supplies of food and clothing. Much, however, remains to be done, and those particularly who in years gone by have made money by Cornish mining should now think of the poor miner. But, happily, the whole mining population is not unemployed. There is still something doing, still some workings being pushed forward with seeming vigour. A fair representation of the case would be that really good miners have no difficulty in obtaining work, and that mining captains will employ none but the best. The inexperienced are not wanted, the dull are not wanted, those slightly infirm are not wanted, those upon whom there is any stain are not wanted. In other words, the few are sought for eagerly, and the mass rejected. To employ all again, to restore happiness into the humble dwellings, and to scatter plenty, the all-pervading depression of the time must be removed. That disappearing, the mining claims of Cornwall and Devon cannot fail to command attention. The wealth still in store, in depth and mountain, will, as it ever has done, promise a return equal to, if not in excess, of, any other enterprise in which English capital may be employed. Nor, be it said, is there any present doubt of this in the public mind. On the contrary, the opinion gains ground daily that whenever confidence revives another mining mania will shortly follow.

In anticipation of that good time, what I have often urged in the *Mining Journal* cannot be repeated too frequently. New mining capital in Cornwall and Devon should seek out new ground to work upon. Where exploration has not been carried, there it should be pushed, under the proper safeguards of mining experience and modern scientific skill. Such experience and skill are largely available in the present day; so much so as to divest mining of much, if not of all, the uncertainty of former times. The vice of misleading is, however, perhaps stronger than was ever known. Expensive men abound, and not less numerous are the reckless men. From such new mining capital should do its best to stand aloof. New mining projects should emanate from good quarters, and, in the absence of old expensive workings, there should be no excuse for giant capitals. In truth, if one thing more than another has been taught by the breaking up of the credit system throughout the country, it is the danger of concerns in which there are great sums of money. Such concerns are at times unwieldy; and, if not so, there is the constant danger of their capital not being fully and profitably in use. In mines with large capitals there is another danger—that of taking over such capitals at more than their real value, and by so doing spreading out the earnings until the dividend is scarcely worth having. From this danger, as from the others, new mining ground is wholly free; no unwatering of great depths, no expensive raising, no dead-weight of any kind. During the past year the opening of some new mining ground in Cornwall has been attended with the most encouraging results, repaying the proprietors 200 per cent. upon the outlay. And equally good ground may still be found, requiring little money. Were it possible to start a number of such mines at once, not only would some hundreds of miners find employment throughout the winter, but, when the next good mining time comes round, the proprietors would realise the advantages to which they would be so well entitled. To the furtherance of the cause of the starting of new profitable mines I trust I shall be always found ready to lend a helping hand, and those in search of new ground should refer to the remarks on the subject made by me in previous numbers of the *Mining Journal*. CHARLES THOMAS.

3, *Great St. Helen's, E.C., Jan.* 1.

LLANFAIR GREEN AND BLUE SLATE QUARRY.

SIR,—Your correspondent, in last week's Journal, "A Quarryman," gave the finishing touch, I think, to Mr. Samuel Jenkins in relation to his "Guide," and also supplemented his remarks by giving his own actual, and, therefore, valuable knowledge both of Delabole slate and Llanfair, in the following words:—Speaking of Delabole slate, in which quarry, he, a Welshman, had worked for more than a year, he states—"*I now add that I know of no rock in Wales like it, except Llanfair, and no quarryman could tell any difference in the two.*" This is remarkable confirmation of my statement at the Llanfair meeting on Dec. 5, that the rock was of the same description as that at the Delabole Quarry, in Cornwall, and consequently required very different handling" from Festiniog and slates of that class. "A Quarryman" adds—"There is plenty of good rock in the Llanfair Quarry that would pay well if the parties knew how to take it out."

With reference to Llanfair, it should be borne in mind that the workings are exceedingly shallow, that the rock improves greatly in depth, and that there is no instance in Wales of any quarry becoming absolutely profitable with so small an outlay, and at so inconsiderable a depth as Llanfair has yet reached. Most of the development has been accomplished, but *no time has been allowed for opening out.*

The surveyors and mining engineers who figure in the Journal of the 14th ult. have received a little attention and castigation also from "A Quarryman;" and, although I know him not, I nevertheless feel grateful to him for his voluntary assistance in disabusing the public mind of the fallacy that "mining engineers" and "road surveyors" know anything practically about slate quarries. In future I trust the horizon will be cleared from the mist of speculative notions raised by surveyors and *soi disant* "mining engineers." One sensible practical Welsh quarryman dissipates all the theories and conceits of these "ignorant and vain persons."

To this letter I wish to append a report by one of the first authorities in the kingdom on slate and slate quarries— Mr. Nicholas Ennor. This report was written some years since on the Caergethin, then called the Llanfair Quarry, which is on the same veins as our quarry, and only separated therefrom by a mathematical line, or at most a 3-ft. boundary wall. One of our levels is actually driven into the Caergethin Quarry. With Mr. Ennor's report I quit the subject.

33, *King-street, Cheapside, Jan.* 2. THOMAS HARVEY.

Jan., 1863.—The Llanfair Slate Quarry is situated near Harlech, in North Wales, the slates from which are of light-blue colour, nearly the same as Cornish slates, and are strong and true surfaced. The vein dips at an angle of 45° north-east, and is both over and underlaid by trap. It was worked as a mine to about 60 feet in depth; the vein is not fully laid open on the south, but sufficiently so to show it is a fair working breadth, and slates of every size can be made from it. There is a cargo now lying on the works ready for shipment, and a second may be made ready in a short time, as the men are anxious to have a contract to raise and split. The trap-rock to the north of this slate is only a few feet in thickness, when a parallel vein comes in, but has not been laid open. From surface appearance it is very wide, and I would recommend a cutting to be made across it to prove its quality, and if found good working would at once commence, and it would become a very valuable quarry, as the vein now in work can be wrought at from 15 to 20 per cent. profit. There is one tunnel into the quarry, and a second in about half-way, and on the ground are both a sawing and planing machine. There is a good country sale for the slates, and a port for shipment only half a mile distance. I consider this an eligible quarry to be worked by a few holders with small capital, and should recommend the north vein to be laid open at once, when it is not unlikely the value of the property would be advanced 50 per cent. I am informed that the Welsh Coast Railway is to pass within a few yards of this quarry; this will bring a good country trade from a long distance, as there are but few quarries along the coast east.—NICHOLAS ENNOR.

THE LLANFAIR BLUE AND GREEN SLATE QUARRY.

"Vice oft is hid in virtue's fair disguise,
And in her borrowed form escapes enquiring eyes."

SIR,—Never have I seen better "no case, abuse the opponent's counsel" argument than in Mr. Harvey's letters. In vain do I look for fair reasoning; I beheld nothing but big bow-wow talk. Mr. Harvey's reasons are "like two grains of wheat hid in a bushel of chaff, the which, when found, are not worth the trouble of finding." The man who will not reason is a bigot; the man who dares not reason is a coward; the man who cannot reason is a nincompoop; but the man who reasons to blind and gull the public is a knave. I can fully understand Mr. Harvey's feeble attempts to be witty at my expense. It is the sure sign of a failing, corrupt cause. He who in slate quarrying matters has, doubtless, said to himself many times—

"I am Sir Oracle;
When I do ope my mouth let no dog bark,"

is evidently on the wane. His clients' confidence is shaken. Two of his quarries are suspended, and others will soon follow in the wake. Hence, like a drowning man catching at a straw, Mr. Harvey struggles hard to keep life, and dies hard. He has been

"Laughing and crowing till the feast is o'er,
Now comes the reckoning, and he'll laugh no more."

Mr. Harvey says—"It is not true that Mr. Richards ever worked this quarry; it is not true Samuel Jenkins inspected it eight years ago." My reply to this is simply asking Mr. Harvey kindly to inform us how far their quarry is from the one worked by Mr. Richards? However, *it is true* that Mr. Harvey promised to make the quarry pay large profits; *it is true* he has failed, after squandering a large amount of money in the attempt to do so; *it is true* that after four years' working the quarry has been found to be worthless. To make a good quarry of Llanfair, it must undergo a treatment like Paddy's gun—have a new lock, stock, and barrel. Mr. Harvey further says:—"Nothing is known of him (Samuel Jenkins) there, or his inspection." Probably so, for the day I went there to inspect it I had to hunt about the quarry for someone in charge, to whom I could show my *authority*. But no one could I find. Some of the men, thinking, perhaps, I was one of the company, said the agent was inside; others said he was at the top of the quarry. Ultimately I learned that Mr. Harvey had been there the day before, and had taken the agent *with* him to look at some newly-acquired quarry. At last, a poor careworn man, supposed to be a near relative of Mr. Harvey's, introduced himself as clerk of the quarry, and showed me over the works. It is, therefore, with grave doubts that I entertain *his* declaration "that nothing is known of him there, or of his inspection."

It is evident that four years' working, with plenty of capital, is quite enough to prove any quarry. I do not mean to say a quarry should pay profits in that time, but it should, at least, present such an appearance, and the returns should bear such a proportion to the expenditure, as to warrant the quarry would soon meet its own cost. In this case the returns are so small, and general appearances so disheartening, that the shareholders agreed to suspend operations; and I take it they are the best judges, as they have to provide the money, whilst Mr. Harvey's is the pleasanter task of pocketing his salary as manager. No clap-trap of his will destroy the fact that after four years' working the quarry has been found useless. Mr. Kellow, indeed, says he should like to work it at a fixed price per ton for the slates, but would he work the slates for a price so as to leave a fair margin for profit? Would he, for instance, engage to produce 10,000*l*. worth of slates for 8000*l*.? If so, the company would do well to enter into an arrangement with him. Or, will Mr. Harvey inform us (if he ever descends to such matters of detail) what proportion the slate made bears to the rock removed? and what proportion the actual value of slate made bears to the cost of making them—*i. e.*, the bare cost of making them, getting the blocks out, and converting them into slate, without reference to previous cost? I unhesitatingly say that when I saw the quarry there was no rock in sight that would *pay the cost of mere extraction.*

As to "Quarryman's" production, he is ashamed to father it. *He is a coward*, therefore he will die many deaths. He wants to make us believe he knows nothing of the moon, but his symptoms are decidedly lunary. He ignores scientific quarrying and geological knowledge, but it would be well for deluded shareholders were more of these exercised. "Quarryman" says the quarry alongside paid 12 per cent. This should read that every 100*l*. expended produced 12*l*. worth of slate. A wonderful investment.

Here, again, is surely one more warning to the public not to listen to these dangerous quarry-charmers. Like the salamander, they live and thrive on the very elements that scatter destruction all around. These characters may have great gift of the gab, may have great tact in persuading the uninitiated that their worthless properties are mines of gold, but destruction and disappointment are the sure attendants. Therefore, the public should BEWARE.

SAMUEL JENKINS.

P.S.—It would be too much like Mr. Harvey's bombastic style to publish all my certificates, but I should be most happy to produce them to any gentleman whom it may concern. However, I enclose some from gentlemen whose standing and character in the mining world are well known to you. You will publish them or not, as you think proper.

[Mr. Samuel Jenkins's name is so well and favourably known as a slate quarry inspector that the publication of the certificates and testimonials sent is quite unnecessary.]

SLATE QUARRY REPORTS.

SIR,—Noticing some very ungentlemanly remarks in the letters of Mr. Harvey and "Quarryman," in last week's Journal, on Mr. Samuel Jenkins, and as I have known that gentleman and his late father for many years, I trouble you with a few remarks. His late father was one of the most competent mining managers and engineers in Cornwall. He worked many mines and quarries successfully on his own account, in Cornwall and the Principality, so Mr. Jenkins was brought up in the mining world. I know he has been engaged to inspect in different parts, and he can, no doubt, if he chooses, produce his certificates. His labours, in connection with other gentlemen, to establish a Geological Society and Mining School for Wales, are well known. He has been engaged in the Festiniog district many years, in practical work. Notwithstanding anything Mr. Harvey can say, he is eminently qualified to express an opinion on quarry property.

ANOTHER QUARRYMAN FROM MERIONETH.

TELEGRAMS.

SIR,—It is usual at most offices in which mines are "managed" that telegrams announcing discoveries should be open to all enquiring shareholders as soon as received, even if they are not posted at the Mining Exchange. Another system, however, is sometimes adopted—they are sent off to the printers, and when some 100 or 200 envelopes have been directed, the circulars announcing the discovery are sent off by the night's post to every shareholder. This, Sir, is not showing favouritism. London shareholders, the Paul Pry's, who go enquiring at offices daily for news, get no advantage over their brethren in the country, and the dealers cannot take advantage of either! In theory, Sir, this is excellent, but *practice* would seem to indicate that between the hours of the telegram's arrival and its publication a good many dealers and shareholders sometimes find themselves "sold." Can it be, Sir, that printer's devils speculate?

"ONE SOLD."

[For remainder of Original Correspondence see accompanying Journal.]

THE BORING MACHINE.—At West Wheal Seton meeting an interesting discussion took place respecting the adoption of the boring machine, during which Mr. Loam, jun., stated that he had seen the Mount Cenis machine in operation, and he did not consider it applicable to Cornish mining, as it required more men to attend to it than would do the same amount of work by hand. He thought moreover that it would not do for either driving or sinking on the lode, inasmuch as it would involve breaking down the country as well as the lode itself which should involve greater expense in taking away the stuff, and also in separating the ore, and would besides occasion great waste. Mr. Loam's opinion was, of course, received with much deference, and the adventurers afterwards decided on deferring the question of introducing the machine at West Seton at present, and to watch the experiments now tried with the boring machine at Tincroft Mine.—*West Briton.*

London: Printed by RICHARD MIDDLETON, and published by HENRY ENGLISH (the proprietors), at their offices, 26, FLEET STREET, E.C., where all communications are requested to be addressed. [*Jan.* 4, 1868.